New Crops From Old

by Wallace H. Fuller

Department of Agricultural Chemistry and Soils

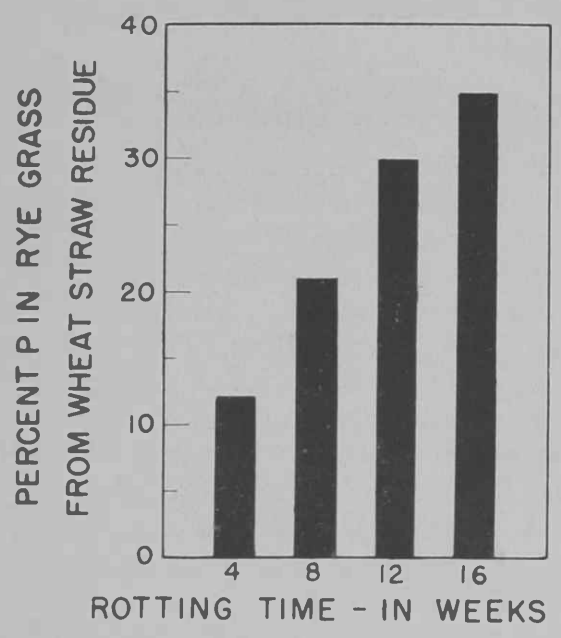
TRACER RESEARCH PROVES THAT CROP RESIDUES ARE A VALUABLE SOURCE OF PHOSPHORUS FOR NEW CROPS. FACTORS CONTROLLING THE AVAILABILITY OF PHOSPHORUS OF CROP RESIDUES FOR THE SUCCEEDING CROP ARE ILLUSTRATED BY THE GRAPHS.

Large quantities of crop residues, such as straw, cotton stubble, vegetable residues, and sorghum stalks, become a part of the soil mass each year. These residues supply more plant nutrients for succeeding crops than all other sources combined. Among the most valuable nutrient elements supplied is phosphorus.

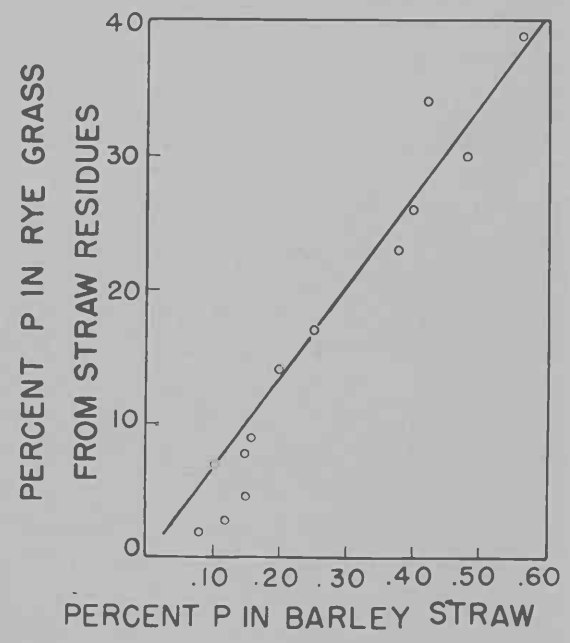
Before plants can use nutrient elements from crop residues, the elements must be released or unlocked and made into an available form. Soil micro-organisms such as bacteria, molds and algae are responsible for this conversion through their action in decomposition or rotting.

All soils are abundantly supplied with the necessary organisms to rot crop residues. The rate of release of nutrient elements, such as phosphorus, is very important to maximum productivity of the succeeding crop.

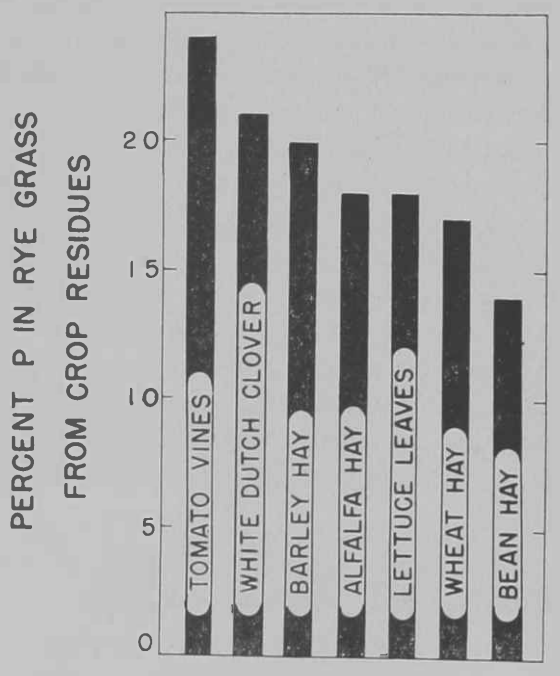
Some of the more important factors controlling the rate of release of phosphorus from crop residues were studied at the University of Arizona by tagging the phosphorus in the residue with radiophosphorus. This new technique permitted the phophorus absorbed by the plant from the crop residues mixed in soils to be distinguished from the phosphorus absorbed from the soil.



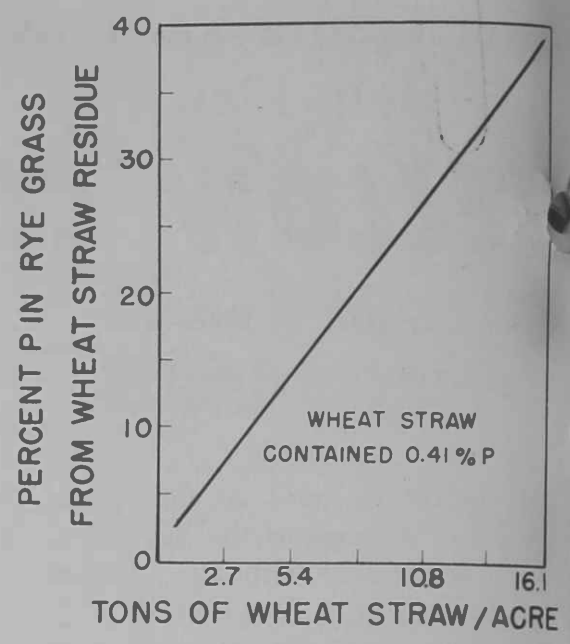
TIME ALLOWED FOR ROTTING OF RESIDUE — The height of the bars in the graph show that the more-rotted straws released more phosphorus to the crop of grass than the less-rotted straws.



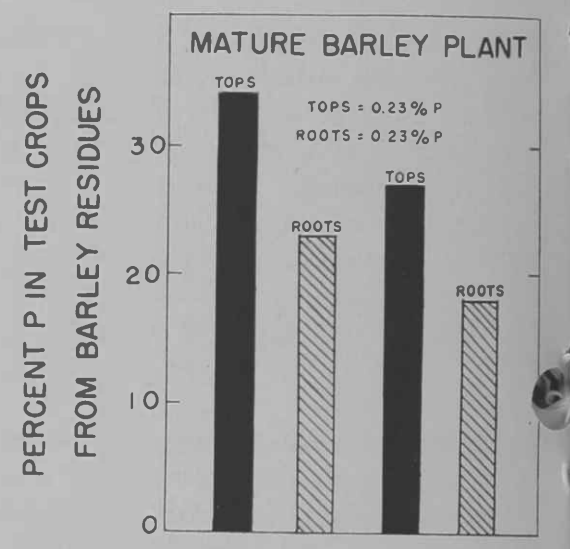
PHOSPHORUS CONTENT OF CROP RESIDUE—Barley straw residue supplies more phosphorus to the grass (test crop) as the amount of phosphorus in the straw becomes greater.



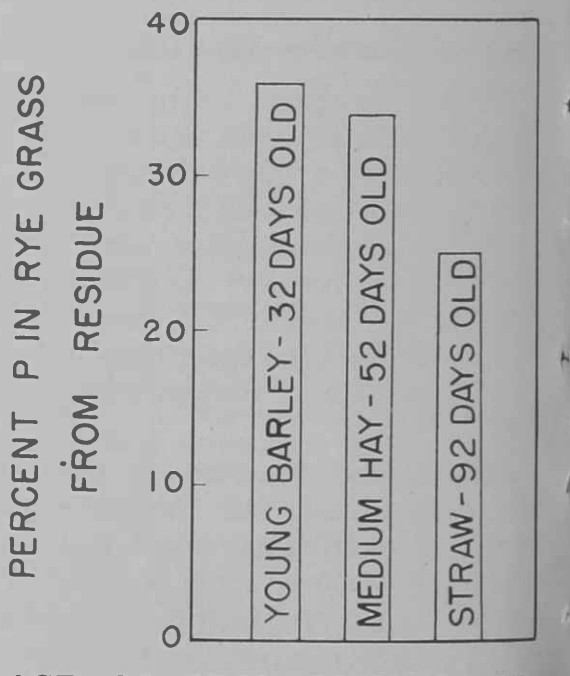
KIND OF CROP RESIDUE—All residues do not supply the same amount of phosphorus to a new crop.



QUANTITY OF RESIDUE ADDED TO THE SOIL—Greater quantities of phosphorus were obtained from wheat straw by the grass when greater amounts of straw were added to the soil.



PLANT PART ADDED TO A SOIL —The barley straw residue provided more phosphorus to the new crop than did the barley root residue.



AGE OF CROP RESIDUE — The younger barley residues furnish more phosphorus to the test crop of rye grass than the mature straw that was 92 days old.